National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: DCA05MA070	Aircraft Registration Number: N803MD
Occurrence Date: 06/07/2005	Most Critical Injury: Fatal
Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
Washington	DC	20001	0641	EDT	

Airport Proximity: On Airport	Distance From Landing Facility:	Direction From Airport:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
Embraer	170	Airplane

Sightseeing Flight: No Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

On June 6, 2005, at 0641 EDT, an NMC-Wollard mobile belt baggage loader, model number TC-888 (serial number TC-888-841, USAirways identification number LD 667) was driven under and struck a USAirways Express Embraer EMB-170, registered in the United States as N803MD. This occurred while the flight crew was preparing the aircraft to operate as USAirways Express Flight 1821. The driver (Fleet Service Agent) of the belt loader was wedged into her seat by the bottom of the aircraft and the belt loader steering wheel and was fatally injured. No other injuries occurred. The aircraft and the belt loader received minor damage during the accident sequence. The event occurred at jetway 23 at Washington Reagan National Airport, Washington, DC.

The fleet service agent was hired by USAirways on May 9, 2005, almost one month prior to the accident and had never driven a belt loader before joining that company. Her part-time duty hours were 0515 to 1145, with Wednesdays and Thursdays off. She received driver training on NMC-Wollard belt loaders on May 10, 2005, during a class titled Secured Area/AOA [airport operating area] Driver Training Class. Her Driver/Movement Training written examination test score was 100%. Her Driver/Non-movement Training written examination test score was also 100%.

Interviews with several relatives revealed that the fleet service agent awoke at 0400 each workday and that her non-work activities in the 72 hours before the accident were routine. The night before the accident, she slept for about 6 hours. They stated that she was in good health, did not take any prescription medications, and was in normal spirits in the days before the accident. They also stated that she been involved in two traffic accidents within the last two years. She owned a Ford Taurus with an automatic transmission. According to the District of Columbia Department of Motor Vehicles, she received her first automobile driver's license on May 10, 2002.

On the day of the accident the fleet service agent was wearing Rebok leather shoes with hard rubber foam soles. The tread patterns on the shoes were moderately worn, but only worn smooth in small areas on the outside edges of both heels.

An autopsy revealed that the fleet service agent died of asphyxiation due to thoracic compression. Toxicological examination of blood and tissue samples revealed the presence of diphenhydramine at a concentration of less than 0.10 milligrams per liter. Diphenhydramine is an antihistamine contained in over-the-counter medicines such as Benadryl and is used to treat allergic reactions.

Two security video cameras recorded portions of the accident sequence, but due to the camera angles, neither one showed enough of the sequence to enable the determination of vehicle speed at the time of impact with the airplane.

The single eyewitness to the accident stated that he saw the fleet service agent approach the aircraft from the right rear, turn to the right around a fuel cart located off the right wing, and

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saw her trying to stop the belt loader. He speculated that her foot may have slipped off the brake pedal at that time.

The NMC-Wollard TC-888 belt loader is a four-wheeled gasoline powered, single seat vehicle equipped with an open driver's compartment and a 297.5 inch continuous moving belt assembly. The belt assembly can pivot, via hydraulics, at its rear end to facilitate different aircraft baggage door sill heights. When the belt assembly is lowered completely, the vehicle is 47.5 inches high, measured from the top of the steering wheel to the ground. The weight of the vehicle is 5,900 pounds.

An accelerator pedal and a brake pedal are located in the footwell of the belt loader. Both are metal, and the 2 by 4 inch brake pedal has raised holes in it to improve foot traction. The right edge of the pedal also has a 5/8 inch raised lip. The accelerator pedal is curved, and is 3 inches by 2 inches. The pedals are 4 inches apart laterally.

The initial examination of the vehicle revealed no external damage other than damage to the steering wheel, steering column, and the operator's seat. The upper portion of the steering wheel had struck the underside of the airplane during the impact sequence and was bent into an oval shape to the rear and in a downward direction. Deformation to the steering column originated at the point where it was held to the vehicle structure by a U-bolt. The backrest of the tubular steel seat was bend slightly to the rear. The front tires of the vehicle were deflated. This occurred after the accident during the rescue attempt. A small amount of hydraulic fluid was noted near the front right wheel assembly. There was no evidence of breaks or kinks in the hydraulic lines leading to the steering actuator.

The front tires were then reinflated and the vehicle was transported to a USAirways maintenance hangar. When the engine was started and the steering wheel was turned, the steering wheel would continue to rotate on its own after turning it about 30 degrees in either direction until the front axle stops were contacted. The wheel rotation could not be stopped by human intervention. The vehicle exhibited this tendency while lifted off the ground on a hydraulic lift, as well as while the vehicle was sitting on the pavement.

USAirways technicians then removed the accident steering column and steering control unit (SCU) and installed an operable steering column and SCU on the accident belt loader. When the accident steering column and steering control unit were removed from the vehicle, the steering column was observed to be deformed slightly in a downward direction.

The vehicle's brake system was then examined using a skid test. All four wheel assemblies achieved a locked condition when the brakes were fully applied. Also, the vehicle's maximum sustained speed of 18 miles per hour (mph) was measured utilizing a police speed-detecting laser.

An examination of the vehicle's engine and drive components revealed no damage or defects. The throttle return springs were firm and provided good return. The accelerator foot pedal was not damaged, and was able to move without any restrictions or objects impeding its movement.

The steering column and SCU were then examined using Hydraulic Control Division of the Eaton Corporation's final production test standards as examination guidelines. An Eton T-handle steering tool was fitted to the steering control unit in place of the bent steering column. When the control unit was pressurized and the T-handle was rotated, the steering system did not exhibit the runaway steering inputs that were previously noted. In addition, the steering column assembly mating connection to the SCU (a 12-tooth spline) exhibited rubbing along some of the spline teeth, indicating that abrasion against the SCU body had occurred. The accident SCU passed Eaton's final production test without any noted deficiencies.

The unit was then dissembled and examined at the Eaton manufacturing facility. During the

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examination, no broken or worn parts were noted, however several contact marks were found on the seal gland bushing and spool. These marks indicated that the spool had been side loaded. The resulting friction would not have allowed the spool to move freely with respect to the sleeve. Therefore, the control orifices inside the SCU would have been held open, and would allow the SCU to continue to command a steering wheel turn until the front axle stops were contacted. The evidence indicated that this defect noted in the steering mechanism was the result of the belt loader's impact with the airplane and not a preexisting fault.

An examination of the maintenance history of the vehicle was accomplished and no significant trends or recurring deficiencies were noted.

Weather conditions near the time of the accident included overcast skies, a forward visibility of 9 miles, a temperature of 68 degrees F, and a dew point of 64 degrees F. No precipitation was falling and the winds were out of 260 degrees at 4 knots.

The friction on the asphalt ramp surface was tested on the day following the accident using continuous friction measuring equipment. The condition of the ramp was the same as it was on the morning of the event. The average friction was measured at 0.740 at an average speed of 40.5 miles per hour.

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Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
Washington Reagan National	DCA	Ft. MSL	NA		

Runway Surface Type:

Runway Surface Condition:

Type Instrument Approach: NONE

VFR Approach/Landing: None

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
Embraer	170	

Airworthiness Certificate(s): Transport

Landing Gear Type: Retractable - Tricycle

Homebuilt Aircraft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	70	78153 LBS	2

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Turbo Prop	General Electric	CF34-8E	14000 LBS

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
Continuous Airworthiness		Hours	Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?
No	No	No

Owner/Operator Information

Registered Aircraft Owner	Street Address	City	State	Zip Code
USAirways	P.O. Box 12346	Pittsburg	PA	15231

Operator of Aircraft	Street Address	City	State	Zip Code
Same as Reg'd Aircraft Owner	Same as Reg'd Aircraft Owner			

Operator Does Business As: US Airways Express

Operator Designator Code: USAA

- Type of U.S. Certificate(s) Held:

Air Carrier Operating Certificate(s): Flag Carrier/Domestic

Operating Certificate:

Operator Certificate:

Regulation Flight Conducted Under: Part 121: Air Carrier

Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only

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First Pilot Information

Name	City	State	Date of Birth	Age

Sex:	Seat Occupied:	Principal Profession:	Certificate Number:

Certificate(s):

Airplane Rating(s):

Rotorcraft/Glider/LTA:

Instrument Rating(s):

Instructor Rating(s):

Type Rating/Endorsement for Accident/Incident Aircraft?	Current Biennial Flight Review?

Medical Cert.:	Medical Cert. Status:	Date of Last Medical Exam:

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time										
Pilot In Command(PIC)										
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used?	Shoulder Harness Used?	Toxicology Performed?	Second Pilot? Yes

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Same as Accident/Incident Location		DCA		EDT

Destination	State	Airport Identifier

Type of Clearance: Unknown

Type of Airspace:

Weather Information

Source of Briefing: National Weather Service

Method of Briefing:

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
KDCA	0651	EDT	Ft. MSL	NM	Deg. Mag.

Sky/Lowest Cloud Condition: Few 7000 Ft. AGL

Condition of Light:

Lowest Ceiling: Overcast 25000 Ft. AGL

Visibility: 9 SM

Altimeter: 29.94 "Hg

Temperature: 20 °C

Dew Point: 18 °C

Wind Direction: 260

Density Altitude: Ft.

Wind Speed: 4

Gusts:

Weather Condtions at Accident Site: Visual Conditions

Visibility (RVR): Ft.

Visibility (RVV) SM

Intensity of Precipitation:

Restrictions to Visibility:

Type of Precipitation:

Accident Information

Aircraft Damage: Minor

Aircraft Fire: None

Aircraft Explosion None

Classification:

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot					
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -					
Other Ground	1				1
- GRAND TOTAL -	1				1

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Administrative Information

Investigator-In-Charge (IIC)

Robert P. Benzon

Additional Persons Participating in This Accident/Incident Investigation:

Mark R Kimmel
FAA, FSDO #27, Dulles, VA